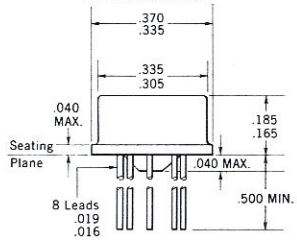
μA730
DIFFERENTIAL AMPLIFIER
FAIRCHILD LINEAR INTEGRATED CIRCUITS

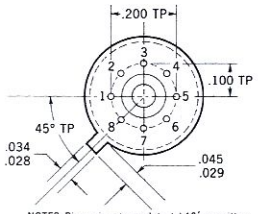
GENERAL DESCRIPTION — The μA730 is a differential amplifier constructed on a single silicon-chip using the Fairchild Planar* epitaxial process. This device has a wide range of applications since it has both a differential input and output; any combination of single-ended or differential configurations can be employed at its input and output. The emitter follower output stage gives this device a low output impedance making it useful as a preamplifier.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	15 V
Differential Input Voltage	±5 V
Common Mode Input Voltage	2.5 to 5.5 V
Internal Power Dissipation (Note 1)	300 mW
Operating Temperature Range	−55°C to +125°C
Storage Temperature Range	−65°C to +150°C
Lead Temperature (Soldering, 60 seconds)	+300°C

PHYSICAL DIMENSIONS
in accordance with
JEDEC(TO-99) outline

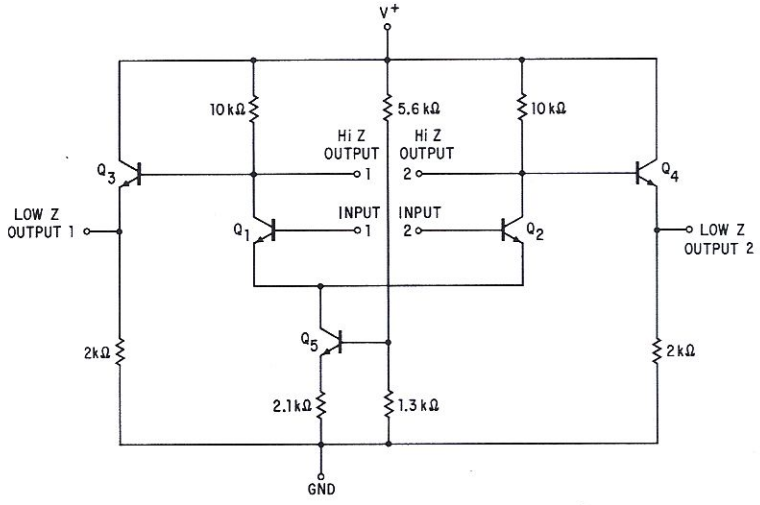




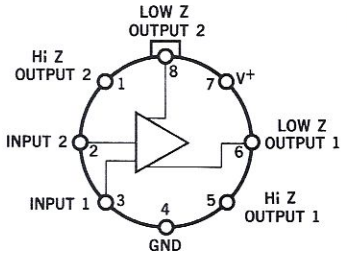
NOTES: Dimensions as per latest J-10 committee
All dimensions in inches
Leads are gold-plated Kovar
Package weight is 1.22 grams

Order Part No. U5B773031X

SCHEMATIC DIAGRAM



CONNECTION DIAGRAM
(Top View)



Note: Pin 4 connected to case

NOTES:
(1) Rating applies for case temperature to +125°C; derate linearly at 5.6 mW/°C for ambient temperatures above +105°C.

*Planar is a patented Fairchild process.

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FAIRCHILD SEMICONDUCTOR
A DIVISION OF FAIRCHILD CAMERA AND INSTRUMENT CORPORATION

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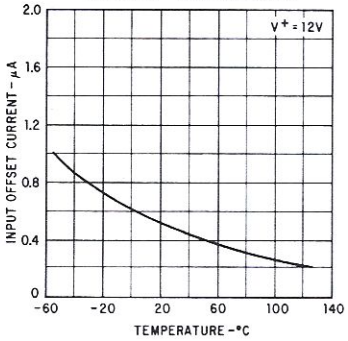
MANUFACTURED UNDER ONE OR MORE OF THE FOLLOWING U. S. PATENTS: 2981877, 3015048, 3025589, 3064167, 3108359, 3117260; OTHER PATENTS PENDING.

ELECTRICAL CHARACTERISTICS ($T_A = 25°C$, $V+ = 12.0$ V, and $V_{CM} = 3.5$ V unless otherwise specified)

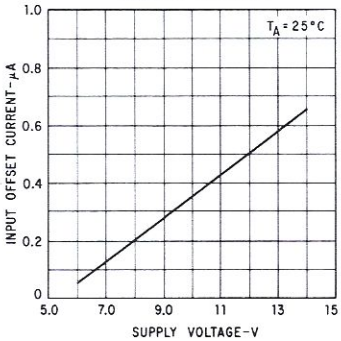
PARAMETER (See Definitions)	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input Offset Voltage	$R_S \leq 50\Omega$		1.0	2.5	mV
Input Offset Current			0.5	1.5	μA
Input Bias Current			3.5	7.5	μA
Input Resistance		5.0	20		kΩ
Differential Voltage Gain	$R_L \geq 100$ kΩ	100	145	160	
Differential Distortion	$R_L \geq 100$ kΩ		80	300	mVpp
Bandwidth		1.0	1.5		MHz
Single-Ended Output Resistance			70	500	Ω
Output Voltage Swing	$R_L \geq 100$ kΩ	5.0	8.0		Vpp
Supply Current	$R_L \geq 100$ kΩ		9.5	13	mA
Power Consumption	$R_L \geq 100$ kΩ		114	156	mW
The following specifications apply for $-55°C \leq T_A \leq 125°C$:					
Input Offset Voltage	$R_S \leq 50\Omega$			3.5	mV
Input Offset Current	$T_A = +125°C$		0.2	1.5	μA
	$T_A = -55°C$		1.0	3.0	μA
Input Bias Current	$T_A = -55°C$		6.5	15	μA
Input Resistance		0.9			kΩ
Input Voltage Range		3.5		5.2	V
Common Mode Rejection Ratio	$R_S \leq 50\Omega$, $f \leq 1.0$ kHz, $+3.5\text{ V} \leq V_{CM} \leq +5.2\text{ V}$	70	85		dB
Differential Voltage Gain	$R_L \geq 100$ kΩ	90		175	
Common Mode Output Voltage		5.5	7.0	7.75	V
Output Resistance				600	Ω
Output Voltage Swing		4.5	6.8		Vpp
Supply Current	$T_A = -55°C$		10	15	mA
	$T_A = 125°C$		8.0	11	mA
Power Consumption	$T_A = -55°C$		120	180	mW
	$T_A = 125°C$		96	121	mW

TYPICAL PERFORMANCE CURVES

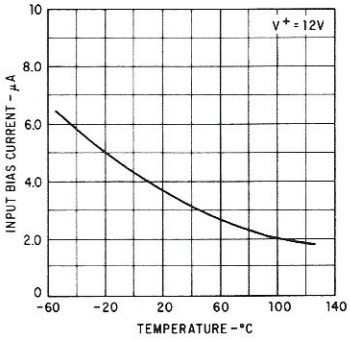
INPUT OFFSET CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



INPUT OFFSET CURRENT AS A FUNCTION OF SUPPLY VOLTAGE

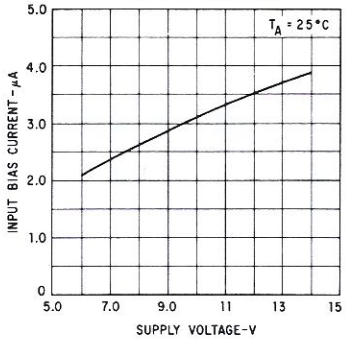


INPUT BIAS CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE

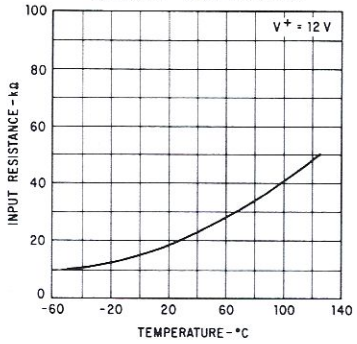


TYPICAL PERFORMANCE CURVES

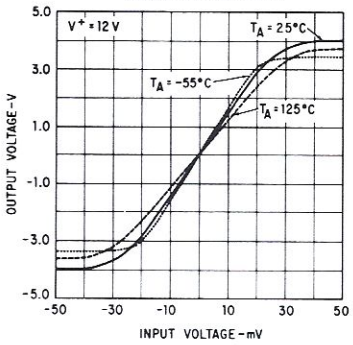
INPUT BIAS CURRENT AS A FUNCTION OF SUPPLY VOLTAGE



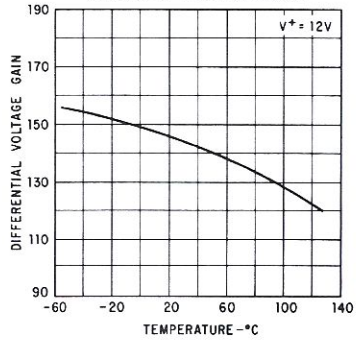
INPUT RESISTANCE AS A FUNCTION OF AMBIENT TEMPERATURE



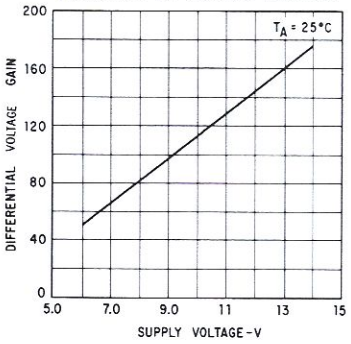
VOLTAGE TRANSFER CHARACTERISTICS



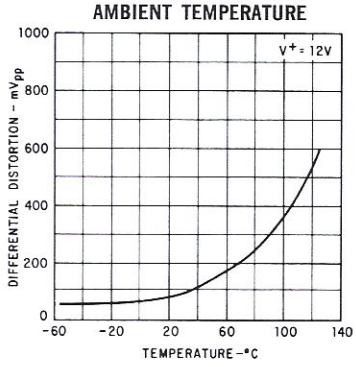
DIFFERENTIAL VOLTAGE GAIN AS A FUNCTION OF AMBIENT TEMPERATURE



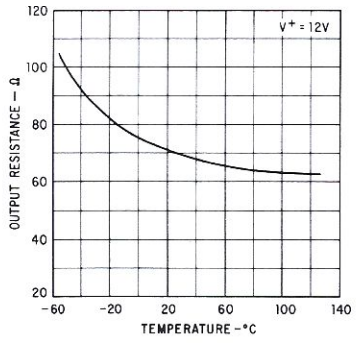
DIFFERENTIAL VOLTAGE GAIN AS A FUNCTION OF SUPPLY VOLTAGE



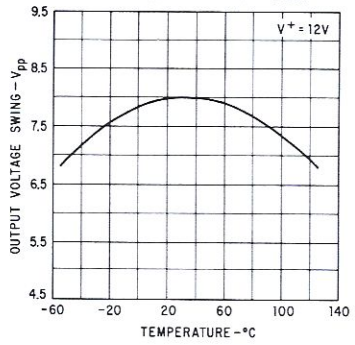
DIFFERENTIAL DISTORTION AS A FUNCTION OF AMBIENT TEMPERATURE



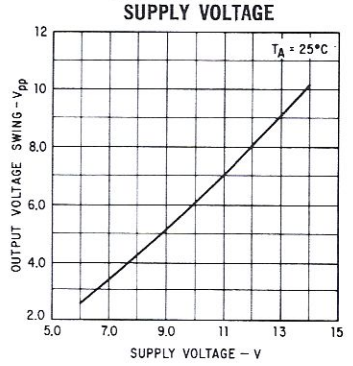
OUTPUT RESISTANCE AS A FUNCTION OF AMBIENT TEMPERATURE



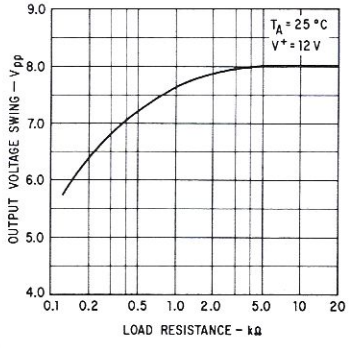
OUTPUT VOLTAGE SWING AS A FUNCTION OF AMBIENT TEMPERATURE



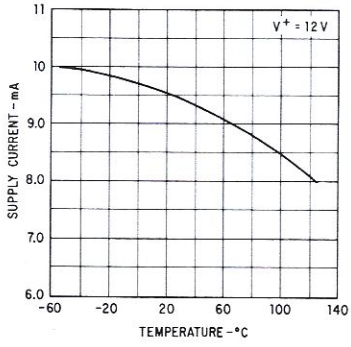
OUTPUT VOLTAGE SWING AS A FUNCTION OF SUPPLY VOLTAGE



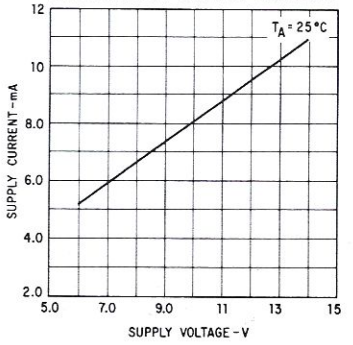
OUTPUT VOLTAGE SWING AS A FUNCTION OF LOAD RESISTANCE



SUPPLY CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



SUPPLY CURRENT AS A FUNCTION OF SUPPLY VOLTAGE

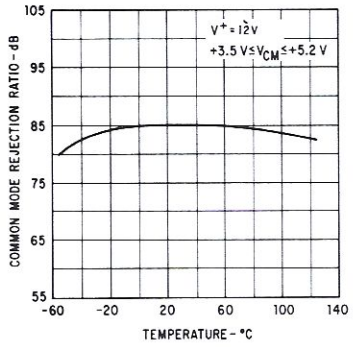


DEFINITION OF TERMS

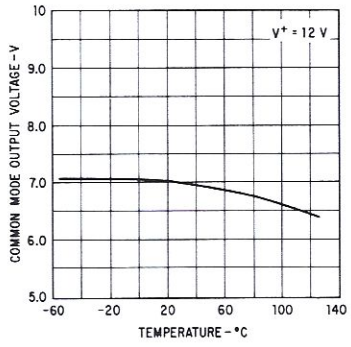
INPUT OFFSET VOLTAGE—That voltage which must be applied between the input terminals to obtain zero differential output voltage.
INPUT OFFSET CURRENT—The difference in the currents into the two input terminals with the output at zero differential volts.
INPUT BIAS CURRENT—The average of the two input currents.
INPUT BIAS RESISTANCE—The resistance looking into either input terminal with the other grounded.
INPUT VOLTAGE RANGE—The range of voltage which, if exceeded on either input terminal, could cause the amplifier to cease functioning properly.
COMMON MODE REJECTION RATIO—The ratio of the input voltage range to the maximum change in input offset voltage over this range.
DIFFERENTIAL VOLTAGE GAIN—The ratio of the change in the differential output voltage to the change in voltage between the input terminals producing it.
DIFFERENTIAL DISTORTION—The A.C. unbalance in the output common mode voltage produced by unsymmetrical output voltage swings.
BANDWIDTH—The frequency at which the differential voltage gain is 3 dB below its low frequency value.
OUTPUT RESISTANCE—The resistance seen looking into either output terminal with the output at differential null.
COMMON MODE OUTPUT VOLTAGE—The average voltage at the two output terminals referred to ground.
OUTPUT VOLTAGE SWING—The peak-to-peak output swing that can be obtained without clipping.
SUPPLY CURRENT—The current required from the power supply to operate the device with no load.
POWER CONSUMPTION—The DC power required to operate the amplifier with no load current.

TYPICAL PERFORMANCE CURVES

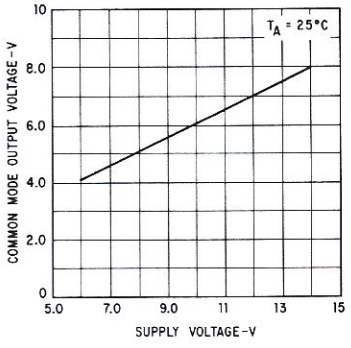
COMMON MODE REJECTION RATIO AS A FUNCTION OF AMBIENT TEMPERATURE



COMMON MODE OUTPUT VOLTAGE AS A FUNCTION OF AMBIENT TEMPERATURE



COMMON MODE OUTPUT VOLTAGE AS A FUNCTION OF SUPPLY VOLTAGE



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